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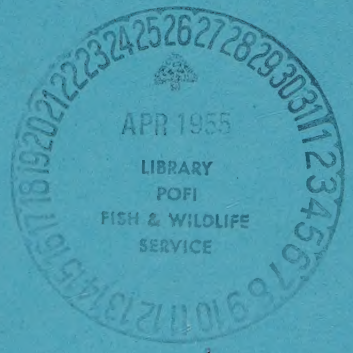
SCOTTISH HOME DEPARTMENT

Marine Research
1952 No. 1

Statistics of the Scottish Halibut Fishery 1930-1949

By A. D. McINTYRE, B.Sc.



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STATISTICS OF THE SCOTTISH HALIBUT FISHERY 1930-1949

INTRODUCTION

The statistics of halibut caught in European waters have been surveyed by various authors. Fulto (1905) discussed the North Sea halibut statistics for the years 1901-1903. Jespersen (1917), in a genera paper, briefly surveyed the English and Scottish landings between 1907 and 1914. The same autho (1938) considered the statistics, from all countries, of the halibut fishery round Faroe, Iceland, an Greenland up to 1936, while Devold (1938), in a paper on net fishing, referred to landings from som of the important grounds. Published data are lacking, however, for recent years.

The present paper surveys the statistics of halibut landed by Scottish vessels at Aberdeen betwee 1930 and 1949, and since approximately 90% of the Scottish halibut landings are made at Aberdeen the figures may be taken to represent Scotland. Although for some grounds this involves repeating wor already published, it has been thought desirable in order that comparable figures for all grounds ma be tabulated.

A summary of catches by British and foreign vessels is included to demonstrate the relative importanc of the Scottish figures.

Most of the data given below have been obtained from unpublished records of the Fisheries Divisio of the Scottish Home Department (until 1939, the Fishery Board for Scotland). The principal ground are:—

1. Faroe, comprising coastal areas round the islands as well as the oceanic banks.
2. Iceland, comprising chiefly the various "flats" and "deeps" round the south and west coas
3. Greenland, comprising chiefly the grounds on the east coast.
4. Western grounds, comprising Rockall and grounds off the north and west coasts of Scotlan
5. North Sea.

For each ground most of the data refer to an extremely wide area, and, within the broad limi of the ground, the exact fishing position is not stated. Thus landings from the coastal regions at Far are grouped with those from the oceanic banks, while at Iceland no distinction is made between groun off the south and west coasts. Recently, however, data have been made available relating to the fishi effort and position of individual vessels. The present paper, presenting a general picture of the Scotti halibut fishery up to and including 1949, is intended as an introduction to more detailed work no in progress.

THE EUROPEAN HALIBUT FISHERY

Table I shows the catches in thousands of kilos (1,000 kilos=approx. 20 cwts.) of the princip European countries engaged in the halibut fishery between 1930 and 1947.

Up to 1935, the largest catches of halibut were landed by England, followed by Norway, wi Scotland and Germany some way behind. In 1936, however, the English landings fell, and from 19 to 1939 Norway held the lead, with England second, and Scotland and Germany again followin These four countries accounted for about 95% of the total pre-war European landings. During the w fishing by most countries was greatly reduced. Iceland, however, was able to maintain and increa her fishing effort, so that for the years 1942-1944 her halibut landings surpassed those of Norway. 1947 while Norway had regained her lead, the second place was occupied by Scotland, followed England, Iceland and Belgium, in that order.

TABLE I

Catches in thousands of kilos of halibut by the principal European countries, 1930-1947.

Year	Belgium	Denmark	England	Faroe	Germany	Holland	Iceland	Norway	Scotland	Sweden
1930	21	3	7,310	29	524	40	413	4,833	2,276	17
1931	10	6	8,092	51	530	31	543	5,335	1,904	35
1932	22	22	6,873	106	611	26	322	5,961	1,748	32
1933	12	23	6,667	42	545	8	294	5,276	1,421	31
1934	15	30	7,335	57	543	35	383	3,860	1,528	34
1935	18	36	6,345	181	593	49	382	3,728	1,394	48
1936	19	161	4,872	71	748	58	271	6,272	1,671	52
1937	30	87	4,565	78	859	63	256	5,905	1,521	49
1938	35	83	3,177	123	1,038	58	411	3,454	1,669	42
1939	56	8	2,017	—	1,087	53	336	3,249	1,259	48
1940	—	1	561	—	5	19	859	1,276	837	10
1941	—	2	410	—	1	—	736	1,352	414	10
1942	—	3	395	—	1	—	1,228	1,015	307	2
1943	—	2	417	—	2	—	1,001	1,126	437	10
1944	—	2	343	—	1	—	1,073	723	735	13
1945	1	1	424	—	—	3	1,349	1,488	1,109	24
1946	33	9	1,396	—	166	13	653	3,889	2,121	61
1947	128	35	2,264	—	41	20	717	5,172	2,582	58

The "Bulletin Statistique" shows that, in 1947, halibut were caught in fair quantities (i.e. over 10,000 kilos per annum) on ten grounds. Figure 1, which indicates the percentage of the total catch for 1947 taken from each ground, shows that five grounds yielded almost 90% of the halibut.

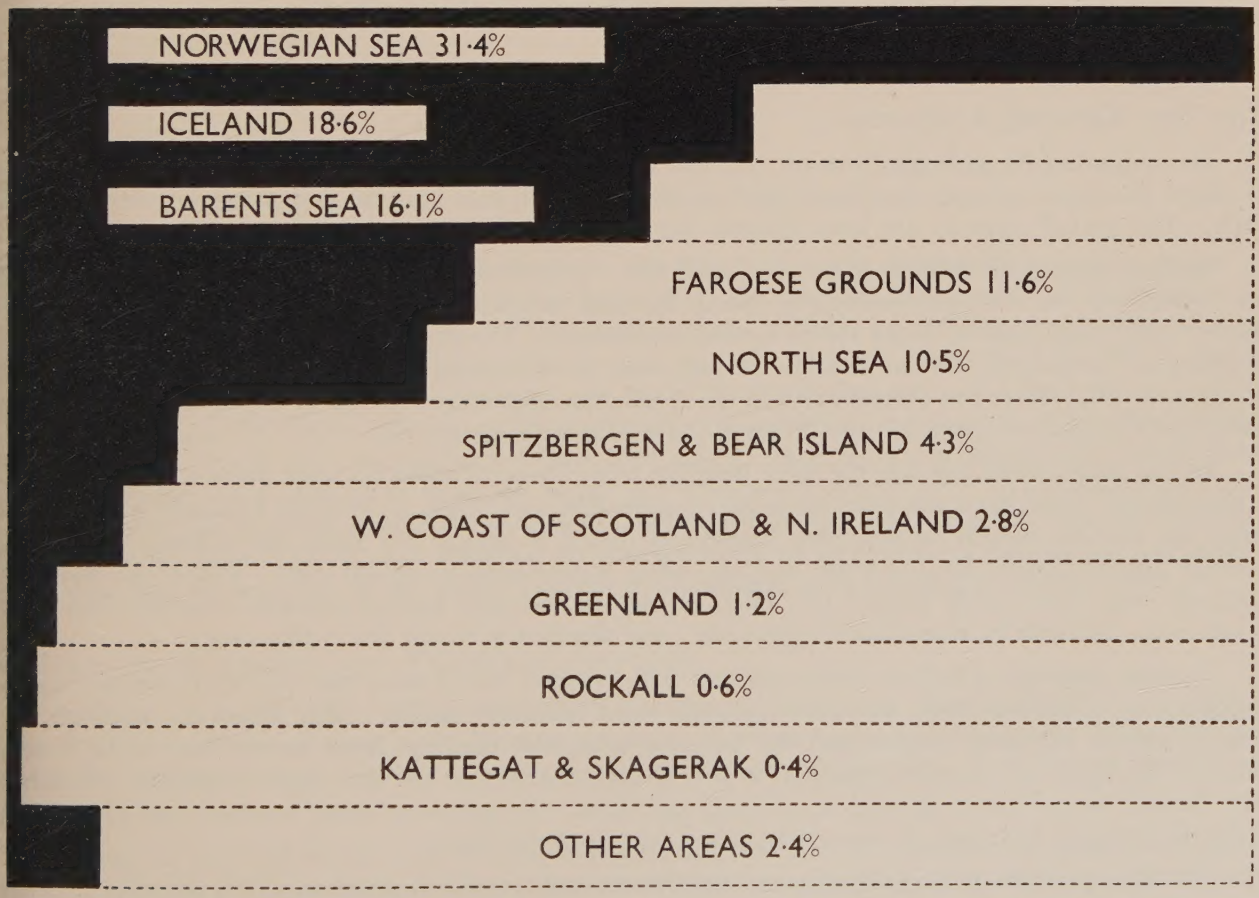

FIG. 1.—The percentage of the total European halibut catch for 1947 taken from each ground.

Table II gives the percentage of the total catch from each ground taken by the various countries for the year 1947. In this year, Scotland took halibut from seven grounds, from four of which she landed more than any other country. The Norwegian Sea, which provided most halibut, was fished almost entirely by Norway, which had also the largest share in the Barents Sea fishery, and a considerable interest in the North Sea and Bear Island. England landed halibut from all grounds while Iceland's halibut catch was taken entirely from round her own coasts.

TABLE II

Percentage of the total catch from each ground taken by each country in 1947.

Grounds	Belgium	Denmark	England	Germany	Holland	Iceland	Norway	Scotland	Sweden
Norwegian Sea	—	—	5·0	—	—	—	94·9	0·1	—
Iceland Grounds	3·0	—	28·6	—	—	35·0	0·6	32·8	—
Barents Sea	—	—	14·9	—	—	—	84·9	0·2	—
Faroese Grounds	—	—	44·6	—	—	—	2·3	53·9	—
North Sea	5·6	2·0	7·5	1·0	1·7	—	20·1	59·9	2·2
Spitzbergen and Bear Island	—	—	74·7	6·1	—	—	19·2	—	—
W. Coast Scotland, N. Ireland	—	—	37·1	—	—	—	—	62·9	—
Greenland	—	—	20·4	—	—	—	11·7	67·9	—

THE SCOTTISH FISHERY

The Five Grounds Compared

In comparing the grounds from the point of view of fishing intensity, landings, and catch per unit of effort, the years 1930 to 1949 have been divided into five-year periods, and averages calculated for each. The period 1940-44 has been omitted because of the exceptional conditions then operating.

Halibut fishing intensity is shown in Table III. Considering the liners, in the period 1930-1934 the North Sea was the most intensively fished, but the concentration of fishing effort changed to Faroe during 1935-1939, and in more recent years, to Iceland. Throughout the whole period the fishing intensity at Greenland was low compared with that on the other grounds. The major part of the Scottish trawling effort was concentrated in the North Sea, with Faroe second in importance. A notable feature of the post-war period is the increase in trawling at Iceland.

In the years before the war the liner landings from Faroe (Table III) were greater than from any other ground. Greenland stood second in importance, followed closely by Western Grounds and Iceland. After the war the weight landed from Iceland increased to almost five times the pre-war figure, the average annual weight for the years 1945-49 being approximately 23,000 cwts. Faroe and Western Grounds were respectively second and third in importance with annual averages of 6,295 cwts. and 3,146 cwts., followed by Greenland (1,981 cwts.) and finally the North Sea (1,840 cwts.).

Trawler landings of halibut before the war were greatest from Faroe, with the North Sea second in importance. Landings from the other grounds were relatively small. After the war, although the general picture remained unchanged, the increase in trawler landings from Iceland should be noted. Considering liners and trawlers together, it will be seen that before the war larger quantities of halibut were landed from Faroese grounds than from any other. In post-war years, however, the yield from Icelandic grounds has risen to more than twice that from the Faroes.

Our best estimate of the abundance of halibut on each ground is given by catch per unit of effort (Table III). In some areas, however, the grounds are very variable, and the estimates are necessarily

TABLE III

Showing for British liners and trawlers, in five year periods, the average annual weight (in cwts.) of halibut landed at Aberdeen, the average annual number of lines (liners) and hours (trawlers) fishing, and the average catch per unit of effort from each ground.

	LONG LINE VESSELS								
	1930-1934			1935-1939			1945-1949		
	Weight	Lines	C/100L	Weight	Lines	C/100L	Weight	Lines	C/100L
Faroe	5,286	32,814	17·3	5,839	42,413	13·7	6,295	10,187	58·2
Iceland	3,440	14,719	25·9	4,615	15,871	21·1	23,022	31,098	61·5
Greenland	6,739	6,727	104·0	2,501	4,034	70·0	1,981	1,445	132·0
Western Grounds	5,028	24,382	16·8	3,531	16,255	20·3	3,146	8,348	37·7
North Sea	2,878	47,577	5·4	1,019	16,683	5·5	1,840	6,265	27·6

	TRAWLERS								
	1930-1934			1935-1939			1945-1949		
	Weight	Hours	C/100H	Weight	Hours	C/100H	Weight	Hours	C/100H
Faroe	3,123	141,231	5·5	3,946	56,545	7·7	4,164	54,764	7·8
Iceland	201	4,302	5·5	194	5,234	5·5	565	13,902	6·1
Greenland	—	—	—	—	—	—	—	—	—
Western Grounds	352	27,472	1·2	124	14,523	0·8	113	10,351	1·4
North Sea	2,556	480,563	5·4	3,311	566,273	6·0	1,799	212,467	0·9

subject to considerable variation, particularly in trawling, where the halibut fishery is incidental to that for other species. Throughout the whole period the average catch by liners from Greenland was considerably higher than that from any of the other grounds, a figure of 132 cwts. per 100 lines being reached in recent years. This was followed by 62 cwts. per 100 lines at Iceland, and 58 cwts. at Faroe. The yields from Western Grounds (38 cwts.) and from the North Sea (28 cwts.) were lower. With regard to trawling, the Faroe region gave the highest figures, with an average catch of 7·8 cwts. per 100 hours fishing in recent years, as against 6·1 cwts. at Iceland. In comparison, the trawlers' yields from Western Grounds (1·4 cwts.) and from the North Sea (0·9 cwts.) were poor. Comparable figures for Greenland are not available since Scottish trawlers seldom fish in this area. English trawlers, however, fishing at West Greenland in 1949 recorded an average catch of 12·6 cwts. of halibut per 100 hours, suggesting that for trawlers, as for liners, grounds at Greenland give the highest average yield.

Comparison of Liners' and Trawlers' Catches

In the years 1946-1949, trawlers accounted for only 2% of the total Aberdeen landings of halibut from Iceland, and 4% of those from Western grounds. The corresponding figures for Faroe and the North Sea are higher (44% and 46% respectively), due to the concentration of Aberdeen trawlers on these grounds.

Because of the differences in gear used and grounds fished, it is impossible to attach any great significance to the differences between liners' and trawlers' catches, but Table IV, referring to the average catches per vesssel, indicates the magnitude of these differences.

TABLE IV

Average catch of halibut per trip (in cwts.) by British trawlers and liners at each ground, 1947

Ground	Liners	Trawlers
Western Grounds	85	1·7
Faroe	176	10·6
Iceland	144	3·8
North Sea	56	0·8

The halibut fishery is thus carried on mainly by liners, which usually set out with the express purpose of seeking halibut, and are able to operate in the deep water where large mature fish are found. The occurrence of halibut in trawl catches is incidental, and since trawlers are restricted to more shallow water, their halibut catches consist mostly of young immature fish.

Fishing Grounds at Faroe

The grounds off Faroe include the coastal areas round the islands, as well as the oceanic banks—Faroe Bank, Bill Bailey's Bank, and Lousy Bank. While liners range over all these grounds, the Scottish trawling effort is almost entirely confined to the northern coastal area.

Seasonal Fluctuations (Tables V and VI). Lining intensity in Faroese waters was greatest in the early part of the year (February and March), although a secondary peak occurred in July and August.

TABLE V

Faroe, British Liners (*Aberdeen*)

(*a*) Average number of lines fishing, 1930-49, in '00's of lines.
(*b*) Average weight of halibut landed 1930-49, in cwts.
(*c*) Average catch per 100 lines in cwts., 1930-49.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*)	17	32	33	20	13	23	27	27	22	17	19	23
(*b*)	88	280	432	560	497	823	838	795	558	338	174	131
(*c*)	5·0	12·8	20·3	31·6	40·3	43·9	38·0	53·8	39·9	29·1	14·9	17·0

TABLE VI

Faroe, British Trawlers (*Aberdeen*)

(*a*) Average number of hours fishing, 1930-49, in '00's of hours.
(*b*) Average weight of halibut landed, 1930-49, in cwts.
(*c*) Average catch per 100 hours fishing in cwts., 1930-49.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*)	22	29	43	42	33	78	93	55	35	29	31	34
(*b*)	183	231	289	227	239	544	617	415	273	230	269	300
(*c*)	8·2	7·8	6·7	5·3	7·0	7·7	7·0	8·6	9·3	7·6	9·4	8·1

Landings were greatest in summer when the mean weight landed per month was 818 cwts., compared with 357 cwts., 166 cwts. and 496 cwts. in autumn, winter, and spring respectively. The catch per 100 lines was lowest between December and February, but thereafter rose steadily, reaching a peak in August, when the figures represented a tenfold increase on the January value.

The trawling effort at Faroes (Table VI) was greatest in summer, when the average number of hours fishing per month rose to over 7,000 (representing ca. 80 trips). During the rest of the year the fishing effort was fairly uniform, varying between 2,700 and 3,800 hours per month. The landings ranged between 617 cwts. in July and 183 cwts. in January. They were greatest in June, July, and August. The highest catches per unit of effort, however, were made during the winter months, and the minimum occurred in April.

Annual Fluctuations (Tables VII and IX). The annual liner landings from Faroe, varying with the fishing intensity, fluctuated in pre-war years between 3,800 cwts. (in 1930) and 8,400 cwts. (in 1935).

TABLE VII

Faroe. British Liners (Aberdeen)

(*a*) Total number of lines fishing, in '000's of lines.
(*b*) Total weight of halibut landed, in '00's of cwts.
(*c*) Average catch per 100 lines, in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	22	29	40	32	40	54	48	42	39	28	23	4	—	3	4	8	9	11	12	11
(*b*)	38	45	69	50	62	84	75	45	50	39	32	3	—	20	33	54	69	77	64	50
(*c*)	19·7	17·8	17·1	16·7	15·4	15·1	15·4	10·3	12·4	15·1	14·3	8·4	—	73·8	75·4	48·3	61·6	68·2	64·7	48·4

During the war the landings dropped, reaching zero in 1942, when no Aberdeen liners fished in Faroese waters. Fishing was resumed in 1943, and the landings increased steadily until 1947, when 7,703 cwts. was recorded, a figure which approaches the highest of pre-war times. During the periods 1930-38, 1939-45, and 1946-49, the average annual landings were 5,753 cwts., 3,015 cwts., and 6,508 cwts., respectively. It is of note that although by 1947 the fishing intensity was still below the pre-war minimum, the landing in that year was almost as great as the highest pre-war figure. This reflects an increase in the catch per unit of effort (Fig. 2) which rose from a mean of 15 cwts. per 100 lines in the period 1930-41 to 63 cwts. per 100 lines in 1943-1949. Since halibut are not uniformly available throughout the year, variations in the catch per 100 lines from year to year can be studied more accurately by referring to individual months. Table VIII shows the average monthly catch per 100 lines in cwts. for the period 1930-1949 in five year intervals. It is evident that a considerable increase in catch per unit of effort has taken place in recent years.

TABLE VIII

The average monthly catch per 100 lines in cwts. for the period 1930-1949 in five year intervals by British liners, Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934 ..	6·1	7·9	10·0	19·7	24·3	23·7	26·8	28·6	24·4	19·2	12·4	6·3
1935-1939 ..	3·7	6·4	8·4	18·8	19·0	19·3	23·5	21·3	20·6	10·9	5·6	4·5
1940-1944 ..	3·6	7·5	17·2	17·9	45·0	80·1	32·4	133·8	82·0	23·3	—	47·6
1945-1949 ..	9·1	32·4	45·0	64·9	73·7	72·6	66·1	63·6	57·8	72·1	39·7	29·6

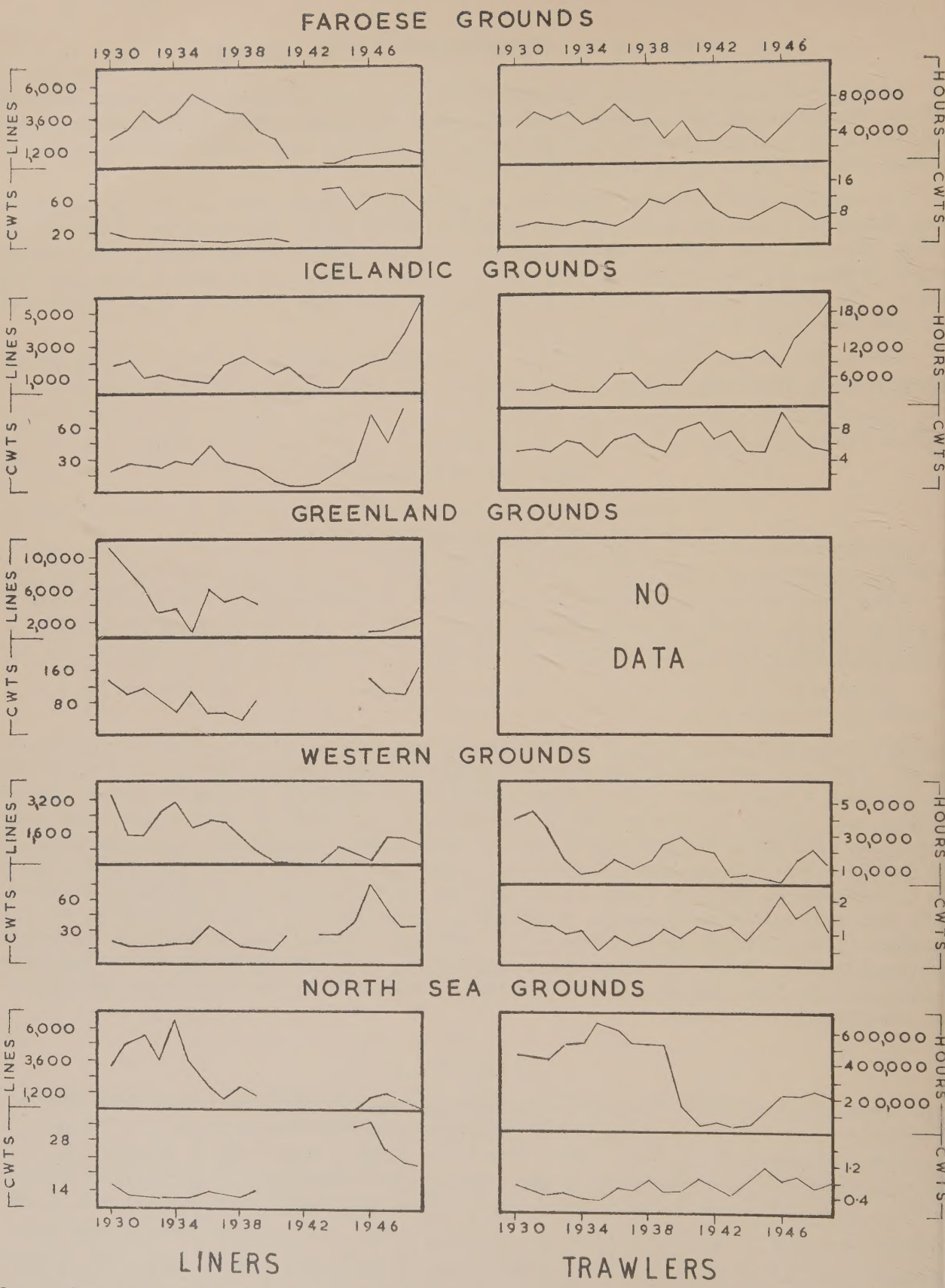

FIG. 2.—Graphs showing, for British vessels landing at Aberdeen, the fishing intensity (upper part of each diagram) and catch per unit of effort (lower part of each) by liners and trawlers during the years 1930 to 1949.

TABLE IX

Faroe. British Trawlers (Aberdeen)

(*a*) Total hours fishing in '000's of hours.
(*b*) Total weight of halibut, in '00's of cwts.
(*c*) Average catch per 100 hours fishing, in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	46	64	58	64	53	59	76	55	59	34	57	29	30	44	40	29	43	64	68	70
(*b*)	25	38	32	31	30	33	32	41	61	31	79	38	27	28	24	24	43	55	41	45
(*c*)	4·8	6·0	5·7	5·3	5·8	5·9	4·6	7·3	10·7	10·0	13·6	14·4	9·0	6·8	5·6	7·9	9·9	8·7	5·9	6·7

Trawling intensity by Scottish vessels at Faroe (Table IX) showed irregular fluctuations but no definite trend. The annual fishing intensity varied about a mean of 59,333 hours (739 trips) in pre-war years, the mean annual variation being less than 10% of this figure. During the war the average number of hours fishing per year was 36·7% below the pre-war mean, indicating that, although trawling at Faroe was interrupted by the war, it was not reduced to the same extent as lining. The weight of halibut landed annually by trawlers throughout the period under review was remarkably uniform, although an increase has taken place in recent years, the average weight landed annually in the periods 1930-38, 1939-1945, and 1946-49 being 3,586 cwts., 3,578 cwts., and 4,613 cwts. respectively.

Table X shows the mean monthly catch per 100 hours fishing in five year periods. The catches increased considerably in the period 1935-1939, and reference to Fig. 2 shows that this increase began in 1937. During the war the upward trend was continued, and although there was a decline in the post-war period, the figures are still above those of 1930-1934 in all months.

The high figures for the years 1940-1944 are of interest. They occurred during the war years, and it might at first seem reasonable to connect them with the reduced fishing effort. However, the peak occurred early in the war years, in 1941, while thereafter, in spite of low fishing intensity, the catch per unit of effort declined (Fig. 2). This suggests that the increase may be not unrelated to a natural fluctuation in the stocks, due perhaps to good brood years. This is discussed more fully on page 23.

TABLE X

Average monthly catch per 100 hours fishing in cwts. at Faroe, for the period 1930-1949 in five year intervals. British trawlers, Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934 ..	5·3	5·3	5·2	4·1	4·4	4·7	6·0	6·2	6·3	6·3	6·6	6·7
1935-1939 ..	7·6	7·8	7·0	6·2	6·8	6·4	8·4	9·1	9·1	7·2	9·2	10·0
1940-1944 ..	10·8	9·0	7·7	5·9	9·2	9·1	11·9	14·0	14·0	10·0	13·7	8·8
1945-1949 ..	8·9	6·7	7·1	4·7	9·4	6·9	8·0	8·1	8·1	7·1	7·9	8·8

Fishing Grounds at Iceland

These grounds consist chiefly of the various "flats" and "deeps" round the south and west coasts of Iceland, bordering on the 100 fathom line. In recent years there has been a tendency for the concentration of the fishery, particularly the line fishery, to move into deeper water, and grounds north-west of Reykjanes are yielding large catches.

Seasonal Fluctuations (Tables XI and XII). Line fishing at Iceland was at a minimum in January, and rose to a peak in October.

TABLE XI

Iceland. British Liners (Aberdeen)

(*a*) Average number of lines fishing 1930-49 in '00's of lines.
(*b*) Average weight of halibut landed 1930-49, in cwts.
(*c*) Average catch per 100 lines in wcts., 1930-49.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*) ..	2	7	11	12	14	17	21	23	22	24	23	15
(*b*) ..	30	84	147	429	825	1,169	1,365	1,161	1,102	936	664	491
(*c*) ..	13·1	9·8	14·7	27·7	45·1	53·8	46·5	43·3	42·2	29·9	22·4	18·5

TABLE XII

Iceland. British Trawlers (Aberdeen)

(*a*) Average number of hours fishing, 1930-49.
(*b*) Average weight of halibut landed 1930-49, in cwts.
(*c*) Average catch per 100 hours fishing in cwts., 1930-49.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*) ..	173	182	532	1,167	2,681	1,233	567	423	659	483	306	180
(*b*) ..	14·9	9·4	15·6	27·2	91·5	73·0	36·9	24·1	41·8	35·2	24·5	15·6
(*c*) ..	9·4	5·5	3·2	2·8	3·3	5·5	6·7	5·5	7·4	8·5	9·2	8·5

The greatest landings were made from June to September with the maximum (a monthly mean of 1,365 cwts. for 1930-1949) occurring in July. The catch per unit of effort showed marked seasonal variations, and reached a peak in June, the figure for that month being more than five times the minimum (February) value.

Trawling intensity at Iceland as shown in Table XII was greatest in late spring and early summer, the maximum of 29 trips occurring in May, and lowest during the winter with an average of two trips per month in December and January. The number of hours fishing in April, May and June, represented 60% of the annual total. The landings varied accordingly, the average in May being 91·5 cwts. compared with only 9·4 cwts. in February. The catch per unit of effort was highest in the winter months, particularly in January, when an average of 9·4 cwts. per 100 hours fishing was taken. The catches fell rapidly, however, reaching a minimum of 2·8 cwts. in April. This seasonal fluctuation is similar to that shown by trawlers at Faroe, where the minimum also occurred in April, and the maximum during the winter.

TABLE XIII

Iceland. British Liners (Aberdeen)

(*a*) Total number of lines fishing in '000's of lines.
(*b*) Total weight of halibut landed in '00's of cwts.
(*c*) Average catch per 100 lines in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	19	21	11	12	11	11	9	18	23	18	13	16	9	7	7	15	20	23	38	59
(*b*)	30	53	30	25	33	20	40	58	70	42	20	15	7	7	9	44	136	127	336	507
(*c*)	20·4	27·8	26·9	25·1	29·4	29·3	43·4	30·1	25·6	21·1	14·4	9·0	8·0	10·1	17·0	29·3	70·3	45·1	79·9	83·1

Annual Fluctuations (Tables XIII and XV). Before the war the annual liner landings, corresponding with the fishing intensity, fluctuated more or less regularly about a mean of 4,004 cwts., the mean annual variation being 34% of this figure.

During the war the fishing in these waters was greatly restricted, and landings reached a minimum of 736 cwts. in 1943. In post-war years there has been a marked increase in fishing intensity, particularly in 1948 and 1949, when the numbers of lines fishing were between 38 and 59 thousand lines annually, compared with the highest pre-war figure of just over 23 thousand lines. The average annual landings in the periods before, during, and after the war were 4,004 cwts., 2,077 cwts., and 27,623 cwts. respectively.

Table XIV shows the mean monthly catch per 100 lines in five year periods. Considerable fluctuations occurred in the first two periods, and reference to Table XIII shows that the peak year before the war was 1936, when the average was 43·4 cwts. per 100 lines. During the war the average catches fell considerably but in the last period a remarkable increase took place, particularly in 1948 and 1949 (Fig. 2) when the average catches per 100 lines were 80 and 83 cwts. respectively. The high averages for recent years were obtained chiefly from the grounds to the west of Reykjanes.

TABLE XIV

Average monthly catch per 100 lines in cwts., at Iceland, for the period 1930-1949 in five year intervals. British liners, Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934 ..	5·3	7·5	18·9	32·9	44·4	45·2	39·4	36·6	32·3	20·7	10·9	6·7
1935-1939 ..	17·9	2·5	24·5	27·2	39·0	39·4	37·7	39·4	39·1	23·5	14·3	3·3
1940-1944 ..	9·3	3·9	3·4	5·2	19·0	15·3	15·5	10·1	20·5	11·6	10·2	8·6
1945-1949 ..	22·0	18·3	13·7	41·1	78·0	107·5	87·1	79·0	84·7	67·6	54·0	52·4

TABLE XV

Iceland. British Trawlers (Aberdeen)

(*a*) Total hours fishing in 'oo's of hours.
(*b*) Total weight of halibut landed in cwts.
(*c*) Average catch per 100 hours fishing in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	43	40	56	43	33	35	65	65	44	52	39	87	105	93	92	102	80	131	169	213
(*b*)	219	191	237	189	168	98	250	238	187	195	378	687	754	481	367	325	585	510	712	695
(*c*)	5·2	5·4	5·1	6·2	5·8	4·2	6·2	7·1	5·4	4·4	7·6	8·2	6·6	7·7	5·1	5·0	9·9	6·9	5·5	5·2

Prior to 1939 the average annual landing of halibut by British trawlers at Aberdeen (Table XV) was 197 cwts., the mean annual variation being only 17·3% of this figure. During the war landings as well as fishing intensity, increased considerably, the mean annual figure for the years 1939-1945 being 455 cwts. The peak occurred in 1942, and thereafter landings fell until 1945. They have risen again in recent years, however, and have been maintained above the pre-1939 level. Table XVI shows the mean monthly catch per 100 hours fishing by trawlers at Iceland, and indicates that on the whole, average catches were higher during the wartime period. Reference to Table XV shows that 1940 and 1941 were the best years. After the war, although the average catches tended to decline, they were in most months still higher than in the pre-war years.

TABLE XVI

Average monthly catch per 100 hours fishing in cwts., at Iceland, for the period 1930-1949 in five year intervals. British trawlers, Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934 ..	8·6	5·9	3·0	2·4	1·9	5·3	7·1	3·4	5·0	5·8	10·9	8·0
1935-1939 ..	15·7	6·0	2·2	1·4	3·3	5·1	4·8	5·2	6·0	11·8	8·1	6·2
1940-1944 ..	4·1	4·5	3·5	4·9	4·7	6·0	8·4	6·6	11·5	9·2	10·1	7·1
1945-1949 ..	17·1	5·1	4·2	2·7	3·7	5·5	6·7	6·7	6·6	9·1	7·1	12·0

Fishing Grounds at Greenland

Since 1930, although English trawlers occasionally visited West Greenland, very few British trawlers have landed fish from Greenland at Aberdeen. We may, therefore, confine our attention to liner statistics for this area. These statistics distinguish between east and west Greenland, but in the period under consideration, less than a dozen landings have been made at Aberdeen from the latter area. It is thus with east Greenland that we are concerned in the following account.

TABLE XVII

Greenland. British Liners (Aberdeen)

(*a*) Average number of lines fishing, 1930-49.
(*b*) Average weight of halibut landed in cwts., 1930-49.
(*c*) Average catch per 100 lines in cwts., 1930-49.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*)	—	—	—	254	504	705	1,154	1,310	902	568	556	355
(*b*)	—	—	—	363	520	923	1,257	1,058	695	379	8	4
(*c*)	—	—	—	140	100	133	109	86	88	85	2	1

Seasonal Fluctuations (Table XVII). In the years 1930-49 Scottish vessels fished at east Greenland chiefly in the summer months, and did not visit this area from January to March. Fishing began in April and reached a peak in July and August when almost 50% of the landings were made. The catch per 100 lines was highest in April and reached a minimum in December.

TABLE XVIII

Greenland. British Liners (Aberdeen)

(*a*) Total number of lines fishing in '00's of lines.
(*b*) Total weight of halibut landed in '00's of cwts.
(*c*) Average catch per 100 lines in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	112	87	65	33	39	9	60	44	46	42	—	—	—	—	—	—	6	9	18	25
(*b*)	125	84	74	34	21	10	31	20	28	36	—	—	—	—	—	—	9	10	19	42
(*c*)	135	107	116	98	62	108	58	54	41	87							143	109	106	171

Annual Fluctuations (Table XVIII). During the war no Aberdeen liners fished at Greenland. Our statistics are, therefore, divided into two periods, 1930-1939 and 1946-1949.

In the first period, fishing intensity varied considerably from year to year, probably because, due to the great distance of these grounds from Aberdeen, vessels did not visit them regularly, but only when weather conditions and other circumstances made it convenient.

The highest landings, corresponding with the most intensive fishing, were made in the early part of the period. Landings fell from about 12,500 cwts. in 1930 to a minimum of less than 1,000 cwts. in 1935, when only four trips were made to this area. When fishing was resumed after the war the intensity increased steadily, 2, 3, 6 and 9 trips being made respectively in the years 1946 to 1949. Fishing intensity is, however, still well below the pre-war level. The mean monthly catches per 100 lines at Greenland are shown in Table XIX. It is obvious that in the pre-war years the highest catches were made in the early part of the period, and Fig. 2 which shows the average catches in each year, indicates a steady decline, a minimum of 41 cwts. being reached in 1938. After the war catches increased considerably, and the annual average varied from 106 to 171 cwts. per 100 lines, figures which compare favourably with early pre-war data.

TABLE XIX

Average monthly catch per 100 lines in cwts. at Greenland, for the periods 1930-1939 and 1946-1949 in five year intervals. British liners. Aberdeen.

Years	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934	139·7	95·3	157·5	104·2	87·0	79·4	102·9	0·7	—
1935-1939	—	111·3	100·0	88·6	63·2	58·2	23·2	2·1	1·0
1946-1949	—	—	175·7	145·6	121·4	132·3	131·2	—	—

Western Grounds

Under this heading are placed grounds off the north and west coasts of Scotland, including Rockall. They are fished chiefly by English and Scottish vessels, with a predominance of the latter in recent years. Trawlers operate mainly on the shallow ground off the north coast of Scotland, and the north-west coast of Lewis. Liners concentrate on the deep water along the 100 fathom line, and at Rockall, which is seldom visited by Scottish trawlers.

TABLE XX

Western Grounds. British Liners (Aberdeen)

(*a*) Average number of lines fishing, 1930-49, in '00's of lines.
(*b*) Average weight of halibut landed, 1930-49, in cwts.
(*c*) Average catch per 100 lines in cwts., 1930-49.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*)	2	4	5	20	21	26	30	29	21	11	9	13
(*b*)	9	3	97	735	636	549	610	658	567	304	155	174
(*c*)	3·7	0·7	13·1	43·4	34·1	28·9	20·1	29·2	35·0	26·1	18·1	19·8

Seasonal Fluctuations (Tables XX and XXII). There was little line fishing on the Western Grounds during winter and early spring. An increase began ir April and reached a peak in July, a considerable

part of the fishery taking place in the summer months. Table XXI shows the average weight landed in three month periods for the years 1930-1949. The seasonal nature of the fishery is obvious.

TABLE XXI

Average weight landed monthly in three month periods from Western Grounds, 1930-49. British liners. Aberdeen.

Weights	Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.
Average weight landed monthly, 1930-49 ..	36 cwts.	640 cwts.	612 cwts.	211 cwts.
Percentages	2·4%	42·7%	40·8%	14·0%

The catch per 100 lines was at a minimum from January to March. A sudden rise took place in April, however, when maximum values occurred and an average catch of 43 cwts. per 100 lines was recorded. Although the figures thereafter declined there was a secondary peak in September, with an average catch of 35 cwts. per 100 lines. Fulton (1905) encountered similar peaks in the average catches of North Sea halibut, and suggested that they were due to a spawning concentration in the spring and a feeding concentration in the autumn.

TABLE XXII

Western Grounds. British Trawlers (Aberdeen)

(*a*) Average number of hours fishing, 1930-49, in '00's of hours.
(*b*) Average weight of halibut landed, 1930-49, in cwts.
(*c*) Average monthly catch per 100 hours fishing in cwts., 1930-49.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*)	9	18	26	14	22	16	12	13	16	12	10	12
(*b*)	8	12	19	20	35	23	21	27	19	7	5	9
(*c*)	0·8	0·7	0·7	1·4	1·6	1·4	1·7	1·6	1·3	0·6	0·4	0·6

The seasonal variations in fishing intensity which were so obvious in the line fishery on Western Grounds, were much less marked where trawlers were concerned (Table XXII). There was a maximum in spring, when an average of 35 trips per month was recorded, but throughout the rest of the year fishing was carried on with almost equal intensity, the average number of trips made per month being 18 in summer, 18 in autumn and 21 in winter. The highest landings were made between May and August, the peak occurring in May, when an average monthly landing of 35 cwts. was made, compared with only 5 cwts. in November. The catch per 100 hours fishing falls naturally into two periods (Table XXII). In the first, from April to September, it was uniformly high, varying only slightly between 1·3 and 1·7 cwts. per 100 hours. Throughout the rest of the year it reached a much lower level, ranging between 0·4 and 0·8 cwts. per 100 hours. It is of interest to note that this type of fluctuation, maxima occurring in summer and minima in winter, is also evident in the catch per 100 hours by trawlers in the North Sea, while at Faroe and Iceland the opposite is the case.

Annual Fluctuations (Tables XXIII and XXV). In the years before the war the liner landings of halibut from Western Grounds fluctuated more or less regularly about a mean of 4,614 cwts. per year, the mean annual variation being 30% of this figure. During the war the landings fell considerably, reaching zero in 1942, when no Aberdeen liners fished these grounds. In post-war years, the trend of the landings has been upward. The average annual landings for the periods before, during, and after the war were 4,614 cwts., 1,241 cwts., and 3,189 cwts. respectively. The fishing intensity showed

TABLE XXIII

Western Grounds. British Liners (Aberdeen)

(*a*) Total number of lines fishing in '000's of lines.
(*b*) Total weight of halibut landed in '00's of cwts.
(*c*) Average catch per 100 per lines in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	34	16	15	26	30	19	21	20	14	7	0·4	0·2	—	3	10	6·0	2	12	12	10
(*b*)	77	30	30	53	61	43	57	44	21	13	1	1	—	7	24	30	14	33	46	35
(*c*)	19·2	15·5	15·3	16·6	17·3	17·3	32·6	21·2	15·5	14·8	14·4	26·0	—	27·1	27·3	38·9	72·4	49·6	36·3	32·5

corresponding variations, but in spite of the recent increase, the post-war number of lines fishing annually was still only 41% of the pre-1939 mean. Throughout the early part of the period under review the catch per 100 lines remained fairly steady, in spite of the fluctuating fishing effort. The average monthly catch per 100 lines in five year periods is shown in Table XXIV. The most striking feature is the increase which took place in the last period, the peak year (Fig. 2) being 1946.

TABLE XXIV

Average monthly catch (in cwts.) per 100 lines from Western Grounds for the years 1930-1949, in five year intervals. British liners. Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934 ..	3·1	0·7	13·0	28·0	26·4	18·7	19·6	19·2	19·5	18·3	18·0	11·5
1935-1939 ..	0·2	0·6	13·5	40·3	25·8	18·3	17·4	17·0	16·7	30·3	23·0	68·0
1940-1944 ..	4·9	—	—	68·6	23·7	25·9	18·1	20·3	29·5	31·5	20·1	18·8
1945-1949 ..	8·5	—	—	107·2	84·3	57·2	26·5	56·2	67·3	28·1	14·7	12·5

TABLE XXV

Western Grounds. British Trawlers (Aberdeen).

(*a*) Total hours fishing, in '000's of hours.
(*b*) Total weight of halibut landed in cwts.
(*c*) Average catch per 100 hours fishing in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	40	44	32	15	7	9	13	10	14	26	29	21	20	5	5	3	1	16	21	11
(*b*)	549	617	362	152	78	64	98	84	125	247	275	296	231	65	53	35	9	236	150	134
(*c*)	1·5	1·3	1·2	1·0	1·1	0·5	0·9	0·7	0·8	1·1	0·9	1·2	1·1	1·2	0·9	1·4	2·2	1·5	0·9	1·1

The trawling effort (Table XXV) on Western Grounds varied considerably from year to year, being highest in the early part of the period (1930-1932) and lower from 1933 to 1938. An increase took place in the initial war years, probably due to greater restrictions having been placed on fishing in other areas. Trawling intensity, however, fell considerably between 1943 and 1946, a minimum being reached in the latter year. The catch per 100 hours fishing by trawlers on Western Grounds is shown in Table XXVI. The average catches in the years 1935-1939 were almost all lower than those of the corresponding months of the earlier period. During the war, however, the catches began to rise again, and this increase continued into the post-war period.

TABLE XXVI

Average monthly catch per 100 hours fishing in cwts. from Western Grounds for the years 1930-1949, in five year periods. British trawlers. Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934 ..	0·9	0·8	0·9	1·7	1·9	1·8	2·0	1·7	0·9	0·6	0·4	0·8
1935-1939 ..	0·7	0·8	0·8	1·1	1·2	1·2	0·8	0·8	1·2	0·2	0·2	0·6
1940-1944 ..	0·6	0·7	0·6	1·1	1·4	1·4	1·4	1·9	1·7	1·0	0·4	0·6
1945-1949 ..	1·0	0·3	0·7	1·5	1·9	1·4	2·7	2·1	1·8	0·5	0·4	0·5

North Sea Grounds

The area of the North Sea fished by Aberdeen vessels is divided for statistical purposes into four sections—Northern, Middle, East Coast and South-east grounds. These grounds are delineated in Fig. 3. The northern area, which includes Shetland and the northern part of Orkney, lies in deep water over 50 fathoms, and in some places over 100 fathoms. The Middle grounds also are mostly deeper than 50 fathoms and exceed the 100 fathom line towards the Norwegian coast. The East Coast grounds include the shallow water areas from the south of Orkney to the Firth of Forth, while the South-east grounds are rather varied in depth, being composed of a complete section across the North Sea, from the shallow water along the British coast to the very deep Norwegian channel. The southern limit of these grounds as defined for our statistics, is the 55th parallel of latitude. Aberdeen vessels seldom fish south of this line.

During the war the practice of separating the data with regard to the above areas was discontinued, and all landings were grouped together under the heading "various North Sea." Since detailed recording of landings has not yet been resumed, the area figures refer only to the years 1930-1938. Nevertheless they may be used to indicate the distribution of the fishing effort. Table XXVII shows the average number of trips made annually to each of the four areas by long line vessels. It shows that line fishing was carried on mostly on the deep Northern grounds, very few trips being made to the shallow water areas.

TABLE XXVII

Average annual number of trips made to the North Sea, 1930-1938. British liners. Aberdeen.

Grounds	Mean annual no. of trips	% of total
Northern ..	249	90·2
East Coast ..	8	2·9
Middle ..	15	5·4
South-east ..	4	1·4

The average annual catches of halibut per 100 lines for the years 1930-1938 from Northern, East Coast, Middle, and South-east grounds were 6·2 cwts., 1·8 cwts., 5·5 cwts., and 7·5 cwts. respectively. These figures give a comparison of the abundance of halibut on each ground. They show that it is relatively scarce on the shallow East Coast grounds but that it becomes increasingly more abundant from the Middle to the deeper Northern grounds. The high value for the South-east grounds is due to a concentration of fishing effort along the edge of the deep Norwegian channel.

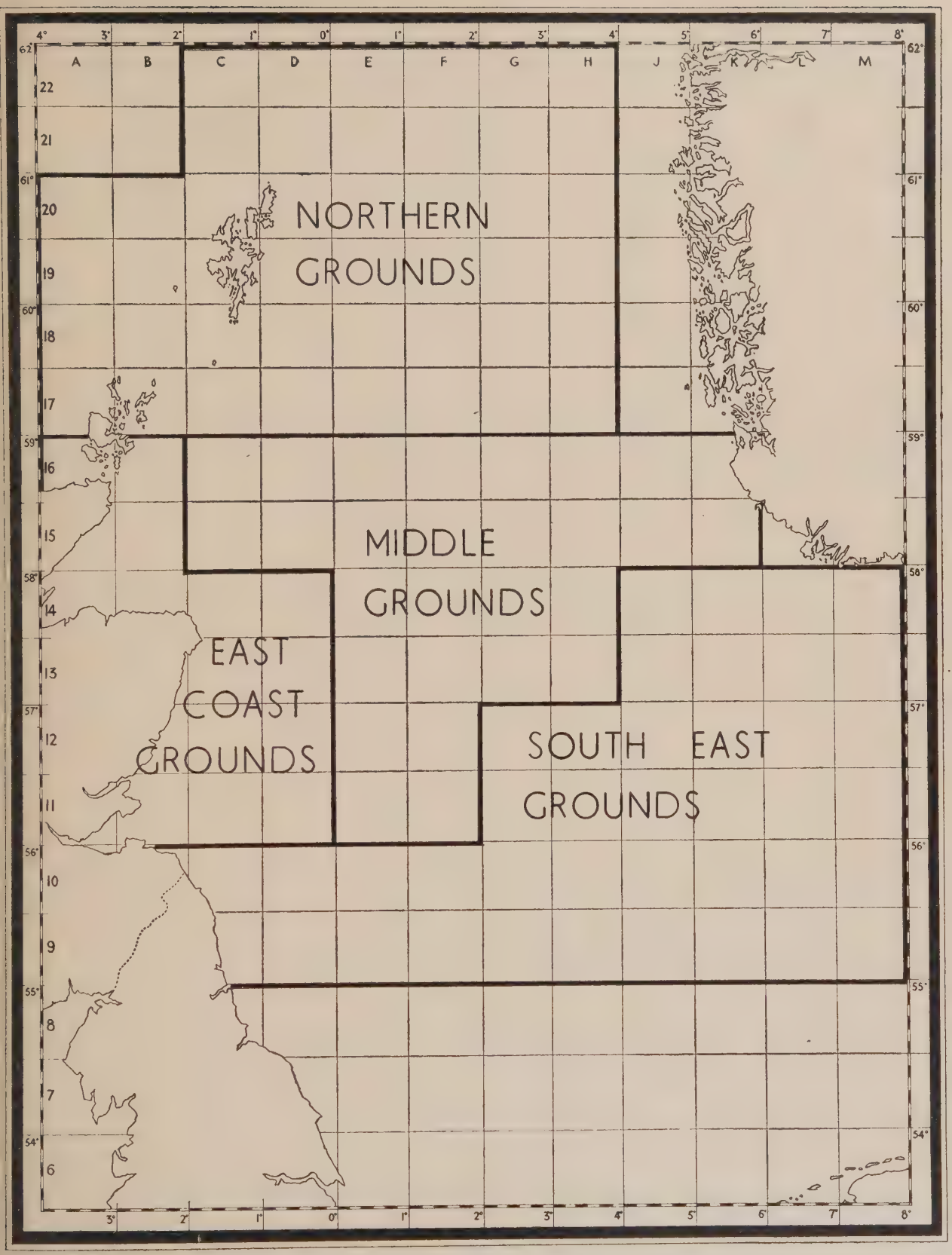
NORTHERN GROUNDS
MIDDLE GROUNDS
EAST COAST GROUNDS
SOUTH EAST GROUNDS
A B C D E F G H J K L M
22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6
62° 61° 60° 59° 58° 57° 56° 55° 54°
4° 3° 2° 1° 0° 1° 2° 3° 4° 5° 6° 7° 8°

FIG. 3.—Showing the zones into which the North Sea is divided for statistical purposes.

Table XXVIII shows the number of trips made by trawlers to each ground and indicates that trawlers' fishing effort was distributed over a very much wider area of the North Sea than liners'.

TABLE XXVIII

Number of trips made by trawlers to each North Sea ground in 1935. British trawlers, Aberdeen.

Grounds	Number of trips by trawlers in 1935	% of total
Northern ..	3,089	32·4%
East Coast ..	7,749	56·2%
Middle ..	2,943	21·3%
South-east ..	11	0·1%

More than half the number of trips were made to East Coast grounds, while the Northern and Middle grounds came respectively second and third in importance.

TABLE XXIX

North Sea. British Liners (Aberdeen)

(*a*) Average number of lines fishing, 1930-49, in '00's of lines.
(*b*) Average weight of halibut landed, 1930-49, in cwts.
(*c*) Average catch per 100 lines in cwts.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	De..
(*a*)	1	3	8	20	86	72	33	30	15	2	—	—
(*b*)	1	5	55	233	723	497	281	222	119	6	—	—
(*c*)	0·4	1·7	11·2	14·2	14·0	11·9	9·5	11·0	12·0	2·3	—	—

TABLE XXX

North Sea. British Trawlers (Aberdeen).

(*a*) Average number of hours fishing, 1930-49, in '000's of hours.
(*b*) Average weight of halibut landed, 1930-49, in cwts.
(*c*) Average catch per 100 hours, 1930-49, in cwts.

Item	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
(*a*)	24	25	24	22	28	27	29	33	32	32	30	32
(*b*)	117	132	152	168	276	188	182	237	183	142	140	163
(*c*)	0·6	0·6	0·7	0·9	1·1	0·7	0·7	0·9	0·7	0·4	0·5	0·5

Seasonal Fluctuations (Tables XXIX and XXX). Over 80% of the annual fishing effort of Aberdeen liners in the North Sea was concentrated into four months—May to August, while during November and December no long line fishing was carried out. The summer peak is due partly to the influx of small drifter liners which find it profitable to take up lining at this time of the year, particularly on such areas as Viking Bank. The highest landings were recorded in May, with an average of 723 cwts.

The catch per 100 lines presented the same general picture as that described by Fulton (1905). There were two maxima, one in spring, with a peak in April, and one in autumn, with a peak in September. Peaks were noted in the same months in the line fishery on Western Grounds.

Variations in the intensity of trawling throughout the year were slight (Table XXX), although there was a tendency to increase in autumn, the peak months being August to November. The highest landings, however, were made in May and August, when averages of 276 and 237 cwts. respectively were recorded, in contrast with the minimum of 117 cwts. in January.

The catch per unit of effort by trawlers was lowest between October and February, while in the rest of the year two clear peaks were evident, one occurring in May and the other in August. These peaks of maximum average catch by trawlers correspond in time with the peaks for liners in the North Sea.

Fulton (1905) studied the catch per 100 hours fishing for trawlers in the years 1901-1903. He concluded that halibut were most abundant "at considerable depths, 50-100 fathoms and more," and points out that the North Sea lies at the southern limit of the halibut's range. It was, however, widely distributed in the North Sea, diminishing in abundance from the deeper areas in the north to the more shallow southern areas. Examining the catch per 100 hours in deeper areas, he found two peaks, one in spring and another in early autumn, with minimum values occurring in winter. In shallow water squares, and in those nearer the coast, halibut were scarcer in spring, the main peak being in July-September.

Out statistics show a general correspondence with the above. Fulton suggests that the seasonal fluctuations may be due to fish moving to deeper off-shore grounds in spring for spawning, and to inshore waters in autumn when herring are present.

TABLE XXXI

North Sea. British Liners (Aberdeen).

(*a*) Total number of lines fishing in '000's of lines.
(*b*) Total weight of halibut landed in '00's of cwts.
(*c*) Average catch per 100 lines in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	31	49	55	37	66	33	17	9	15	10	—	—	—	—	—	1	10	12	6	2
(*b*)	30	33	29	18	33	13	10	8	11	9	—	—	—	—	—	4	37	33	13	5
(*c*)	9·3	5·0	4·5	3·4	4·6	3·6	6·0	5·6	5·4	7·1	—	—	—	—	—	35·5	37·4	25·8	20·1	19·4

Annual Fluctuations (Tables XXXI and XXXIII). Prior to the war, line fishing intensity in the North Sea was rather variable, probably because Aberdeen liners tended to go further afield whenever local conditions were unfavourable, and when distant grounds seemed more profitable. After a peak in 1934, when 498 trips were made, the fishing intensity dropped to an extremely low level, reaching a minimum of only 54 trips in 1937. From 1940 until 1944 there was no line fishing in the North Sea from Aberdeen. It was resumed in 1945, and although rising slightly in the two succeeding years, it has since fallen again, never attaining the level of the early 1930's.

Landings have thus varied considerably, being best in the early years, with a maximum of 3,340 cwts. in 1934. When fishing was resumed after the war, high landings were at first recorded, 3,714 cwts. being taken in 1946, but catches have since declined. The mean weights landed annually in the periods 1930-34, 1935-39, and 1945-49 were 2,878 cwts., 1,019 cwts., and 1,847 cwts. respectively.

The average monthly catch per 100 lines for the North Sea is shown in Table XXXII. The catches in the two pre-war periods were fairly similar in both seasonal variation and magnitude. A striking increase took place in the post-war period and, although the trend is again downward (Table XXXI), the catch per 100 lines in 1949 was still more than twice the highest pre-war figure.

TABLE XXXII

Average monthly catch per 100 lines, in cwts., from the North Sea for the years 1930-1949, in five year periods. British liners, Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.
1930-1934 ..	0·4	2·2	5·8	7·8	6·8	6·5	7·5	4·8	4·1	2·3
1935-1939 ..	—	1·0	5·2	6·6	8·4	6·2	3·2	5·8	4·9	—
1945-1949 ..	—	—	22·8	31·4	30·2	25·9	21·2	37·1	27·3	—

TABLE XXXIII

North Sea. British Trawlers (Aberdeen)

(*a*) Total hours fishing in '000's of hours.
(*b*) Total weight of halibut landed in '00's of cwts.
(*c*) Average catch per 100 hours in cwts.

Item	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
(*a*)	463	432	452	508	549	654	602	534	538	503	179	76	73	68	72	142	232	233	248	208
(*b*)	33	27	23	22	23	25	35	33	40	32	12	6	5	3	7	16	21	22	16	14
(*c*)	0·7	0·6	0·5	0·5	0·4	0·4	0·6	0·6	0·8	0·6	0·6	0·9	0·7	0·5	0·9	1·1	0·9	1·0	0·7	0·8

From 1930 the general trend of trawling intensity in the North Sea was upward, and a maximum was reached in 1935, when 14,576 trips were made. Trawling was greatly reduced during the war, only 1,275 trips being made to North Sea grounds in 1943, and although fishing has since increased, it has not yet risen to the pre-war level. Landings before the war varied from 2,246 cwts. in 1933 to 3,995 cwts. in 1938. They fell considerably during the war, only 293 cwts. being landed in 1943, and although they have since risen, the highest post-war landing of 2,249 cwts. in 1947 is only slightly above the pre-war minimum. Table XXXIV shows the mean monthly catch per 100 hours fishing by trawlers in the North Sea. The most notable feature is the increase in the post-war period, particularly in the summer months from April to July.

TABLE XXXIV

Average monthly catch per 100 hours fishing in cwts. in the North Sea during the years 1930-1949, in five year periods. British trawlers, Aberdeen.

Years	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
1930-1934 ..	0·4	0·4	0·5	0·6	0·9	0·7	0·7	0·6	0·6	0·4	0·4	0·4
1935-1939 ..	0·5	0·7	0·8	0·7	0·9	0·5	0·5	0·6	0·4	0·4	0·5	0·6
1940-1944 ..	0·8	0·6	0·7	0·8	0·9	0·6	0·5	1·0	0·9	0·3	0·6	0·6
1945-1949 ..	0·6	0·5	0·8	1·3	1·7	1·2	1·0	1·2	0·9	0·6	0·5	0·4

DISCUSSION

The foregoing pages show that from 1940 to 1945 inclusive the fishing intensity was greatly reduced due to the war, and that when fishing was resumed the catch per unit of effort had increased on all grounds. Although the increase was possibly due, to some extent, to the reduced fishing effort, there are indications that this was certainly not the only cause.

The catch per 100 hours fishing by trawlers at Faroe (Fig. 2) reaches maximum values during 1940 and 1941 and thereafter falls steadily until 1944. If the increase was due entirely to reduced fishing, it is difficult to explain why the maximum should occur so early in the war. It is possible that the high catches in 1940-1941 were due in part to a natural fluctuation in the halibut stock, and since trawlers at Faroe catch halibut mostly of the second and third year groups, this would indicate good brood years in 1937 or 1938. An exceptional year brood would be apparent in the statistics in a very definite way. Trawlers, fishing in more shallow water and catching mostly young fish, would be first to obtain an increased catch per unit of effort. Later, as the year class migrated into deeper water, it would enter the long line fishery. Thus the good year brood postulated on the basis of trawlers' catches at Faroe in 1940-1941 should be represented by an increase in the liners' catches some years later. Reference to Fig. 2 shows that this did take place.

The position at Iceland is roughly similar. Jespersen (1948) gives details of the catch of young halibut in Faxa Bay. The histogram in Fig. 4 has been drawn up from his data. It indicates a remarkable increase in 1939.

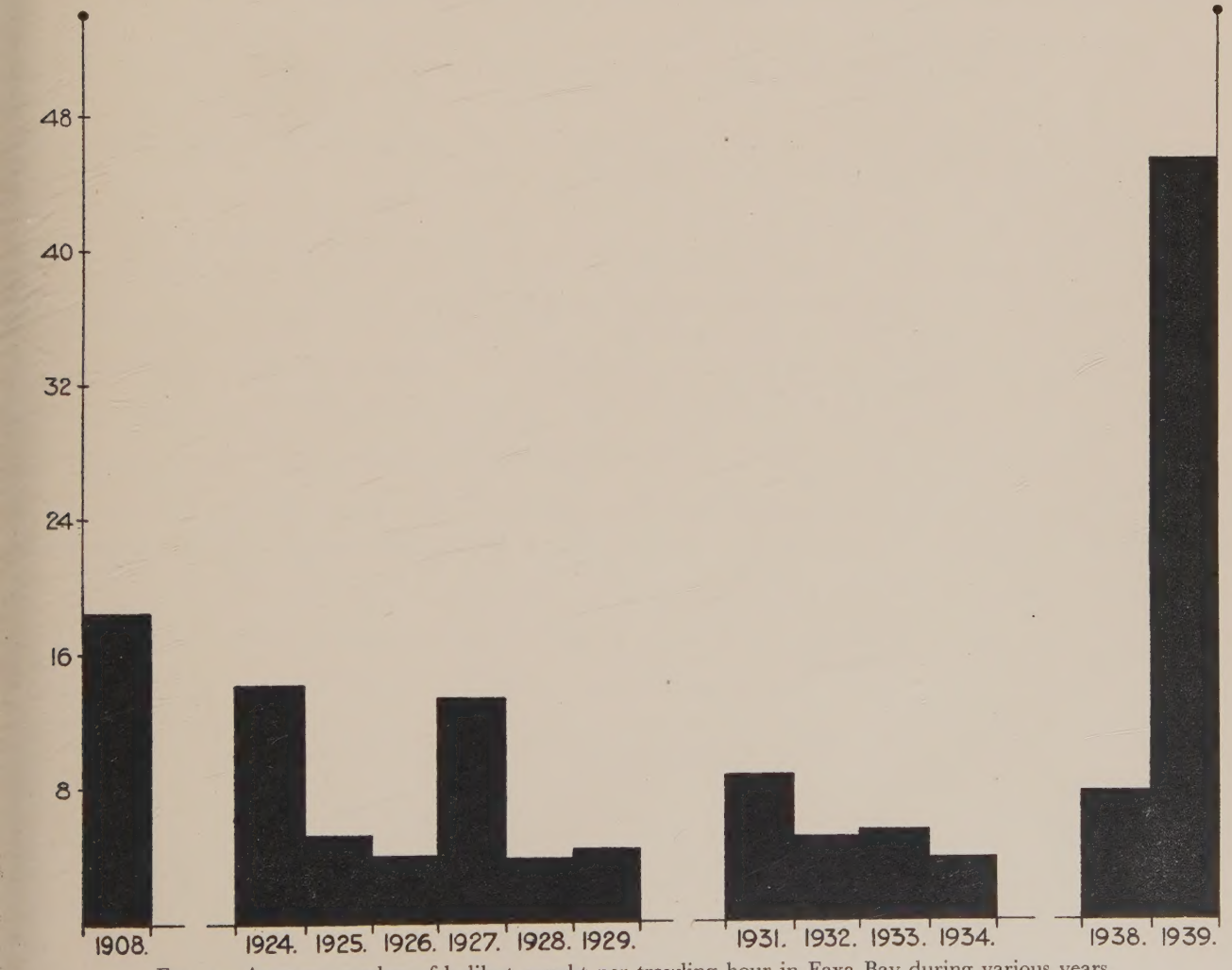

FIG. 4.—Average number of halibut caught per trawling hour in Faxa Bay during various years. From data published by Jespersen (1948).

Assuming the catches to consist mostly of young fish, he suggests that it may imply good brood years in 1937 and 1938. This is supported by our own statistics. Scottish trawlers fishing outside Faxa Bay returned an increased catch per unit of effort in 1940 and 1941 (Table XV) while a rise in the liner yield became apparent some years later (Table XIII).

Roughly similar increases took place on other grounds, and, although Graham (1948) attributes a somewhat similar increase in the early nineteen-twenties to "the benefit of war-time protection," it seems probable that the high yield obtained after 1939 may be due not so much to the reduced fishing effort, as to natural fluctuations in the stock.

SUMMARY

1. This report deals with the statistics of British liners and trawlers landing halibut at Aberdeen from Faroe, Iceland, Greenland, Western Grounds, and North Sea in the years 1930-1949.

2. A summary is given of the extent to which other countries participate in the halibut fishery.

3. It is shown that from the point of view of weight of halibut landed annually in Scotland by British vessels, the grounds at Faroe were of greatest importance in pre-war years. The great rise in catches from Iceland in recent years is noted.

4. The largest quantities of halibut are landed in late spring and early summer.

5. The halibut fishery is carried on mainly by long liners. In normal times less than 5% of the catch from Iceland and Western Grounds is landed by trawlers. This figure is higher for the North Sea and Faroe area.

6. It is suggested that the increase in catch per unit of effort after 1939 is due partly to a positive fluctuation in the stock, probably rising from good brood years in 1937 and 1938.

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